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Abstract

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The present invention is a visual prosthesis for the restoration of sight in patients with lost or degraded visual function. The visual prosthesis includes means for sending operational data from an implantable visual prosthesis to an external unit. Such operational data may include electrode current, voltage or capacitance, power received by the internal unit, and recording of neural activity.

In the Claims:

Please delete claims 1 – 268, without prejudice.

Please add claims 269- 300 as follows:

269. A visual prosthesis comprising:
an external communication unit receiving operational data;
an internal communication unit transmitting said operational data; and
a plurality of electrodes driven by said internal communication unit and stimulating visual neurons to create a perception of a visual image.

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270. The visual prosthesis according to claim 269, wherein said operational data includes current.

271. The visual prosthesis according to claim 270, wherein said current is electrode current.

272. The visual prosthesis according to claim 269, wherein said operational data includes electrode impedance.

273. The visual prosthesis according to claim 269, wherein said operational data includes voltage.

274. The visual prosthesis according to claim 273, wherein said voltage is electrode voltage.

275. The visual prosthesis according to claim 269, wherein said operational data includes whether or not a predetermined compliance voltage has been reached.

276. The visual prosthesis according to claim 269, wherein said operational data includes electrical recording from visual neurons.

277. The visual prosthesis according to claim 269, wherein said operational data includes an indication of power received by said internal communications unit.

278. A visual prosthesis comprising:
an external communication unit receiving operational data;
an internal communication unit transmitting said operational data; and
a plurality of electrodes driven by said internal communication unit and stimulating a retina to create a perception of a visual image.

279. The visual prosthesis according to claim 278, wherein said operational data includes current.

280. The visual prosthesis according to claim 279, wherein said current is electrode current.

281. The visual prosthesis according to claim 278, wherein said operational data includes electrode impedance.

282. The visual prosthesis according to claim 278, wherein said operational data includes voltage.

283. The visual prosthesis according to claim 282, wherein said voltage is electrode voltage.

284. The visual prosthesis according to claim 278, wherein said operational data includes whether or not a predetermined compliance voltage has been reached.

285. The visual prosthesis according to claim 278, wherein said operational data includes electrical recording from the retina.

286. The visual prosthesis according to claim 278, wherein said operational data includes an indication of power received by said internal communications unit.

287. A visual prosthesis comprising:
a video receiver for receiving a video image and converting said video image to a video signal;
and
a video processing unit, coupled to said video receiver and processing said video signal;
an external communications unit transmitting said video signal and receiving operational data;
an internal communications unit transmitting said operational data and receiving said video signal.
a plurality of electrodes driven by said internal communications unit and stimulating visual neurons to create a perception of said video image.

288. The visual prosthesis according to claim 287, wherein said plurality of electrodes stimulate visual neurons on a retina.

289. The visual prosthesis according to claim 287, wherein said operational data includes current.

290. The visual prosthesis according to claim 289, wherein said current is electrode current.

291. The visual prosthesis according to claim 287, wherein said operational data includes electrode impedance.

292. The visual prosthesis according to claim 287, wherein said operational data includes voltage.

293. The visual prosthesis according to claim 292, wherein said voltage is electrode voltage.

294. The visual prosthesis according to claim 287, wherein said operational data includes whether or not a predetermined compliance voltage has been reached.

295. The visual prosthesis according to claim 287, wherein said operational data includes electrical recording from visual neurons.

296. The visual prosthesis according to claim 287, wherein said operational data includes an indication of power received by said internal communications unit.

297. A method of restoring vision in a patient with impaired vision comprising the steps of:

receiving a video image;
converting said video image to a video signal suitable for stimulation of visual neurons;
transmitting said video signal into the patient;
stimulating visual neurons in accordance with said video signal; and
transmitting operational data out of the patient.

298. The method according to claim 297, further comprising the steps of recording neural activity and transmitting said neural activity as part of said operational data.

299. The method according to claim 297, further comprising the steps of measuring the state of individual electrodes and transmitting electrode measurements as part of said operational data.

300. The method according to claim 297, further comprising the steps of measuring power received inside the patient and transmitting said power received inside the patient with said operational data.